

Prior Art Rejection

Claims 1-10 stand rejected under 35 U.S.C. § 103 as being unpatentable over *Franchini et al.*¹ in view of *Martin et al.*² This rejection is respectfully traversed.

The Claimed Invention

The invention as set forth in claim 1 recites a method for the characterization of physical and/or chemical properties of a liquid, characterized in that 1) at least one dependent physical and/or chemical property of a liquid is measured as a function of temperature and a component concentration as independent variables; 2) the values for the component concentration are determined by calculation, based on data from control programs for the change of component concentration in a computer and the temperatures are determined by calculation from the temperature control programs or by measurements; 3) the value of the component concentration is changed by adding in one step or gradually a predetermined amount of another liquid containing a different component concentration, and a representative number of measurements of the dependent physical or chemical property are performed within the whole selected temperature range within the predetermined change of the component concentration; 4) the procedures above are repeated at desired component concentrations and temperatures in order to obtain a wanted number of values; 5) the values obtained for the dependent properties are combined with the values for the independent properties

¹ Franchini, G. et al., "An Approach to the Problem of the Dependence of the Dissociation Constant of Weak Electrolytes on the Temperature and on the Solvent Composition in the Ethane-1,2-diol-2-Methoxyethanol Solvent System," J. Chem. Soc., Faraday Trans. 1, 1989, 85(7), 1697-1707.

² Martin, J.M. et al., "Quantitation of Metals in Liquid Samples by Computer Intelligent Flow Injection Inductively Coupled Plasma Emission Spectrometry," Applied Spectroscopy, Volume 41, Number 6, 1987, pp. 986-993.

to measuring points; and 6) the measuring points electronically stored in the computer are coordinated and visualized in a three-dimensional diagram.

The invention as set forth in claim 7 recites a device for the characterization of the physical and/or chemical properties of a liquid. The device of claim 7 comprises: at least one measuring cell provided with an equipment for the homogenization of a liquid, at least two control equipment, which comprise or are attached to control programs for changing of the two independent variables, component concentration and temperature, in a predetermined manner, the control equipment of the component concentration comprising a dosage organ for the addition of another liquid containing a different component concentration, at least one measuring organ for the determination of at least one dependent physical and/or chemical property of the liquid, and optionally a measuring organ for the determination of the temperature; at least one computer for the reception and storage of data relating to the dependent and independent variables via at least one electronic circuit and the calculation of at least the component concentration from data obtained from the control program and compilation of the received and calculated values into three-dimensional measuring points; and equipment for visualization of the measuring points stored in the computer in a three-dimensional diagram.

The Examiner's Reasoning for Maintaining the Rejection Under 35 U.S.C. § 103

Despite the arguments presented April 18, 2002, the Examiner has maintained the rejection of claims under 35 U.S.C. § 103 based on the asserted modification of *Franchini et al.* in view of *Martin et al.* More specifically, in responding to Applicant's arguments, the rejection asserts on page 4 that:

In this case, the Courts have recognized that providing a mechanical or automatic means to replace manual activity which accomplishes the same result is within the skill of a routineer in the art. Thus even though the Franchini reference does not teach automated control of the dilutions, the Courts have held that such a modification is obvious. In looking to what type of apparatus would be capable of performing the automated dilutions, one of skill would have consulted with the Martin reference because it is clearly preparing samples for analysis through dilution. In consulting with the reference it would have been clear that automation of the dilution would have lead to many expected improvements which would have added additional motivation to the fact that the Courts have held such an automation to be obvious. The fact that applicant may have recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Applicant submits, however, that this reasoning for maintaining the rejection mischaracterizes the differences between the present claims and *Franchini et al.* as merely relating to translating a manual technique to an automatic process. As discussed in detail below, the differences between the claimed invention and *Franchini et al.* are not bridged by merely automating certain aspects of the *Franchini et al.* analysis technique. Instead, even if *Franchini et al.* were modified as stated by the Examiner, differences still exist between the claimed invention and the modified system of *Franchini et al.* Furthermore, as detailed below, Applicant submits that there is no motivation or suggestion in the prior art, or in knowledge generally available to one of ordinary skill in the art, to modify *Franchini et al.* in the manner asserted by the Examiner.

Deficiencies in the Asserted Grounds of Rejection

Franchini et al. describe an empirical approach to clarify the dependence of the dissociation constant of weak electrolytes on the temperature and on binary ethane-1,2-

diol and 2-methoxyethanol solvent systems. In *Franchini et al.*, conductance data from an earlier work was integrated by those obtained from three new mixtures. These new mixtures were prepared with pure manual methods. See p. 1698, 3rd paragraph. First, the solvent mixtures were prepared by weight. The solutions of picric acid at different concentrations were obtained by successive dilution of stock solutions. The concentrations in volume were then calculated from the weight concentrations and the densities. The conductance readings were recorded when they became invariant with time, which took about 30 minutes. P. 1698, 3rd paragraph.

As said above, the process disclosed in *Franchini et al.* is completely manual. Thus, the steps 2), 3), 4), 5), and 6) of claim 1 of the present invention are not performed.

It should also be observed that in the present invention the changes of the component concentrations are made by adding another liquid with a different concentration of the component **to the previous liquid or a part of the previous liquid in the measuring cell**. In *Franchini et al.*, the different samples were individually prepared from stock solutions, while in the present process there is only one sample existing at each point of time, namely the sample in the measuring cell, and, after the measuring of the dependent variable or variables, the succeeding sample is **directly prepared in the measuring cell**. Thus, there are great principle differences between *Franchini et al.* and the present invention in the preparation of samples. Thus, the present invention is not only a simple "translation" of a manual method into an automatic process.

Martin et al. are concerned with the problem of analyzing and measuring the content of different metals in a sample by inductively coupled plasma emission spectrometry by comparison with calibration curves. This means that the measurements are not made in a liquid phase but in a gas phase (plasma). Each sample is placed manually or by an autosampler into the instrument, where it is analyzed with respect to the metals present and their contents by plasma emission spectrometry. In order to be able to compare the content of a metal, it is possible to dilute the sample with an operator-selectable fixed dilution to place all elements within the optimum of a calibration curve range. The dilution of the samples is accomplished by injecting the sample for a shorter period of time. The flush time of the system is increased a corresponding amount. See p. 987, last paragraph and p. 988, 3rd full paragraph. The described method of making dilutions in *Martin et al.* exhibits large differences from the methods of the present invention. In *Martin et al.* the sample is produced outside the measuring cell and transformed to plasma, while in the present invention the liquid samples to be analyzed are produced in the measuring cell in rapid succession. Therefore, there is no need for an automatic sample changer in the present invention. Moreover, in *Martin et al.* there is no equipment for the automatic regulation of the temperature.

From the above it is obvious that the process of *Martin et al.* and the process defined in claim 1 of the present application exhibit large technical differences and have different objectives. The instrument in *Martin et al.* is an analysis instrument that does not and cannot measure a dependent variable as a function of concentration and

temperature and does not have the configuration as the device defined in claim 7 of the present invention.

Furthermore, there is no reason given to a person skilled in the art in any one of the two documents, why the two documents should be combined and how they are to be combined. The Official Action remains silent in this respect. It is also evident that, even if the two documents are combined, it is not possible to obtain a process as defined in claim 1 and a device as defined in claim 7, since the references *Franchini et al.* and *Martin et al.* together do not disclose all the necessary characteristics in claim 1 and in claim 7. For example, the steps 2), 3), and 4) in claim 1 and the feature a) ii) in claim 7, are not disclosed in said references.

The advantage of the present invention is significant and the time for making only the measurements for a three-dimensional diagram is dramatically reduced by the use of the invention compared to a manual method. Due to the procedure of the present invention, it is normally possible to reduce the time between the readings to 1-15 seconds including the time for the preparation of the sample in the measuring cell. Furthermore, all data is obtained in electronic form in the computer and can easily be transferred to a three-dimensional diagram. Thus, it is evident that the present invention has novelty and inventive merit over the combination of *Franchini et al.* and *Martin et al.*

In view of the above, Applicant respectfully requests reconsideration and withdrawal of the Examiner's rejection under 35 U.S.C. § 103.

Request for Telephone Interview

In an effort to expedite prosecution of this application, Applicant respectfully requests a telephone interview with the Examiner to discuss the outstanding grounds of rejection prior to a next Office Action. Since Applicant does not know when the Examiner will next act on this case, the Examiner is requested to contact D. Richard Anderson (Reg. No. 40,439) at (703) 205-8035 to schedule a telephonic interview.

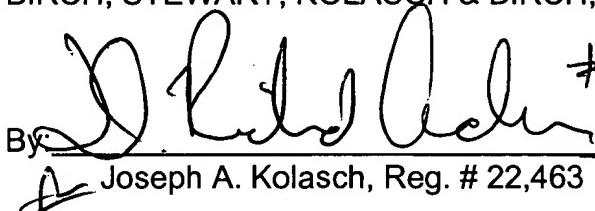
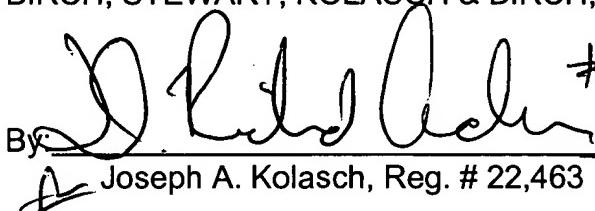
CONCLUSION

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact D. Richard Anderson (Reg. No. 40,439) at the telephone number below.

If necessary, the Commissioner of hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

Respectfully submitted,

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